6.0 Cumulative Impacts

6.1 Framework for Assessing Cumulative Impacts

'Cumulative Impacts' is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7). Although the impacts of individual actions taken separately might be minor, the impact of those same actions taken together may be significant for one or multiple resources.

A cumulative impacts analysis focuses on the resources rather than the planned action and considers impacts that take place on both spatial and temporal scales. On a spatial basis, impacts must be considered both within and outside the Region of Influence (ROI). Time scales for a cumulative impacts analysis are generally longer than project-specific analysis of impacts. The following types of cumulative impacts (adapted from National Research Council 1986) are considered, encompassing impacts on both spatial and temporal scales:

- Time-lagging – Frequent and repetitive actions on an environmental system may result in cumulative impacts when the system does not have time to recover from the impacts of one action before the next action occurs. An example of this is overgrazing of pastureland in arid regions.
- Time-lags – Impacts of actions on environmental systems may not appear until an extensive amount of time has elapsed, such as exposure to carcinogens.
- Space-crowding perturbations – Cumulative impacts on the environment arise from high spatial density of actions. An example of this is decreased water quality on a river into which several factories discharge contaminated water.
- Cross-boundary impacts – The impacts of an action are spatially removed from the location of the action. An example of this is groundwater contamination that migrates offsite of the source.
- Fragmentation – An action results in a change in the landscape pattern. Examples of this are construction of an overhead power line through a forest or construction of a highway that would separate a neighborhood community.
- Compounding impacts – Synergistic or collaborative impacts may result from multiple sources or pathways, such as an adverse health impact resulting from the combination of several pesticides in surface runoff.
- Indirect impacts – Secondary impacts may result from a primary action, such as the development of commerce after a roadway is constructed.
- Triggers and thresholds – Fundamental changes in system behavior or structure can occur when a threshold is reached (as in global warming) or when an action becomes a trigger for system change.

The general approach taken for cumulative impacts analysis in this draft Environmental Impact Statement (EIS) is to:

- Define other activities that could impact resources within the vicinity of the proposed Port Ambrose Deepwater Port (Port Ambrose Project, Port or Project);
- Assess whether impacts from the proposed Project overlap impacts (in time or space) from other activities, potentially creating any of the types of cumulative impacts listed above;
- Total the impacts from the proposed Project with other similar impacts, if impacts are additive and if quantitative information is available, or make a qualitative assessment of total impacts;

- Estimate the proposed Project's incremental contribution to total (cumulative) impacts (as a percentage of total, if quantitative);
- Assign an impact duration (short- or long-term) and an impact descriptor (minor, moderate, or major) to the proposed Project's contribution to cumulative impacts, and discuss whether an impact is adverse or beneficial to the resource, where possible;
- Review mitigation measures for their effectiveness in reducing cumulative impacts and identify further mitigation measures designed specifically to reduce cumulative impacts, if possible; and
- Evaluate whether incorporation of specific alternatives into the proposed Project would change the Project's incremental contribution to cumulative impacts.

The cumulative impacts analysis focuses only on impacts that are similar to impacts that would result from the proposed Project. If the proposed Project would not impact a certain resource, specific habitat, or activity, those particular resources, habitats, and activities, are not addressed in this cumulative impacts analysis in this draft EIS.

Proposed, recommended, or required mitigations may or may not change the incremental contribution of the proposed Project to cumulative impacts. Mitigation requiring avoidance measures that effectively eliminate the impact before the impact occurs, such as minor reroutes of a pipeline to avoid a cultural resource or adjustment of the construction schedule to avoid a species' breeding season, also would eliminate the incremental contribution. Mitigation measures that would reduce the impact or the extent of the impact as the impact occurs, such as turbidity curtains or rip-rap, also would reduce the incremental contribution. Compensatory and other mitigation measures that occur after the impact occurs, such as primary restoration efforts or buying credits to offset the impact, would not reduce or eliminate the incremental contribution to cumulative impacts.

6.1.1 Past, Present Actions, and Reasonably Foreseeable Future Actions

6.1.1.1 Other Liquefied Natural Gas (LNG) Deepwater Ports

Since amendment of the Deepwater Port Act (DWPA) in 2002 to encompass deepwater ports for natural gas, the U.S. Coast Guard (USCG) and the Maritime Administration (MARAD) have received and deemed complete five deepwater port license applications for the East Coast of the United States in addition to the currently proposed Port Ambrose Project (Figure 6.1-1). Of these, only two were licensed and built and only the Northeast Gateway Project is operational.

On May 14, 2007, the Maritime Administrator signed the license for Excelerate Energy, LLC to own, operate, and construct the Northeast Gateway Deepwater Port located in Massachusetts Bay, approximately 11.3 nautical miles south-southeast of Gloucester, Massachusetts. Currently, Excelerate Energy, LLC is consulting with MARAD and other federal agencies to obtain renewal of the required federal permits and authorizations for the continuation of port operations and maintenance activities, as well as address other outstanding operational issues.

On March 26, 2007, MARAD issued a Deepwater Port License to Neptune LNG, LLC to build, own, and operate the Neptune LNG receiving and regasification facility located in Massachusetts Bay, 8.7 nautical miles south of Gloucester, Massachusetts and 19.1 nautical miles, northeast of Boston. By letter dated May 24, 2012, Neptune LNG LLC requested MARAD allow a temporary five-year suspension of operations at the Neptune Deepwater Port. MARAD issued an amended deepwater port license to allow the five-year suspension of operations.

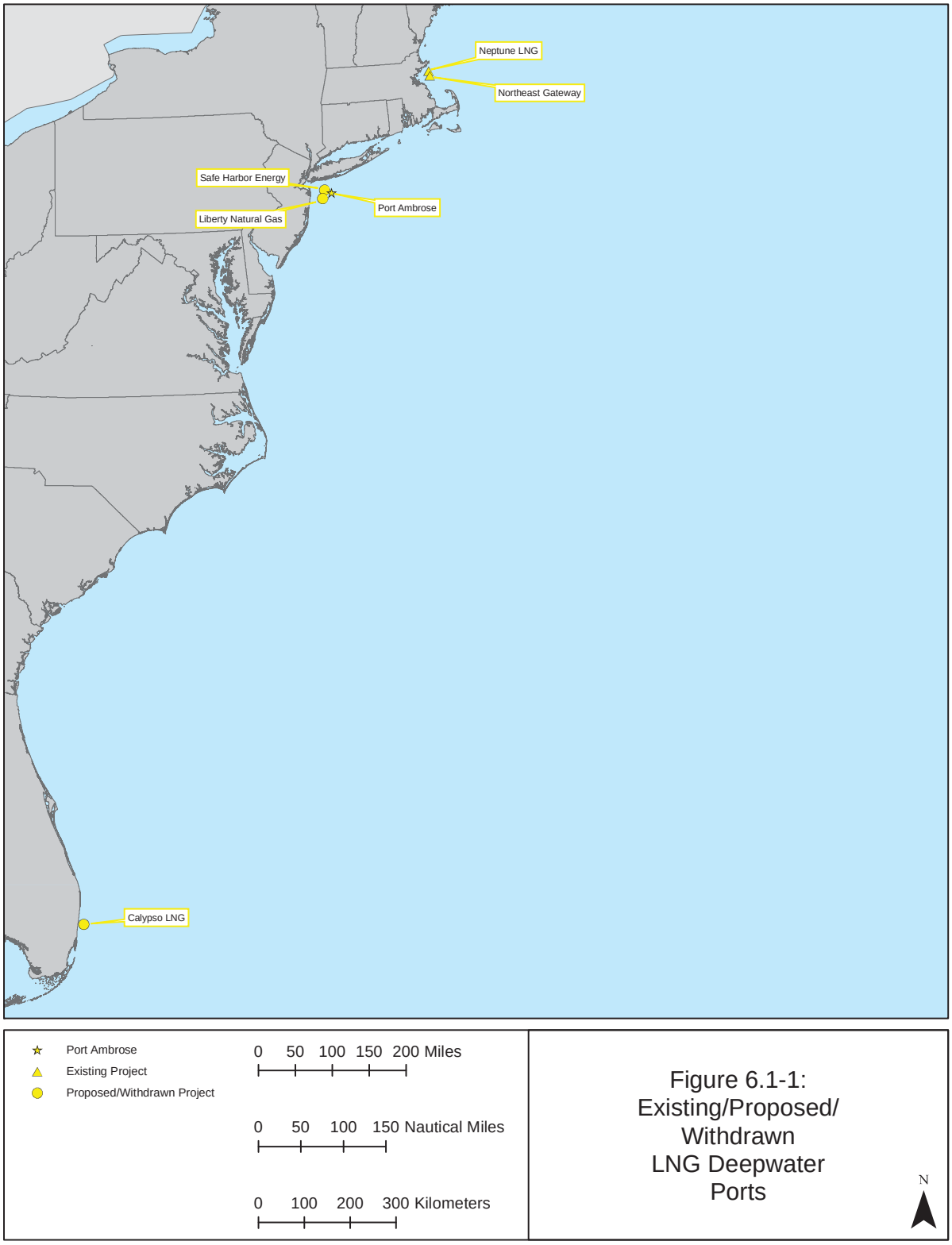

Figure 6.1-1. Existing/Proposed/Withdrawn LNG Deepwater Ports

Calypso LNG LLC filed an application for an LNG facility on March 2, 2006 that was deemed incomplete by MARAD. A revised application was submitted and MARAD deemed the application complete on October 13, 2006. The Calypso project was proposed to be located 10.4 nautical miles off the coast of Port Everglades, Florida. On February 25, 2009, Calypso LNG LLC submitted a letter to MARAD to withdraw their application for the Calypso project, due to significant public interest and environmental impact concerns. In a letter dated February 27, 2009, MARAD acknowledged Calypso LNG LLC's withdrawal and terminated its application for a deepwater port license.

On September 16, 2006, the Atlantic Sea Island Group LLC filed an application with MARAD and the USCG for a license to construct, own and operate an LNG receiving, storage and regasification deepwater port facility, known as Safe Harbor Energy. The proposed Safe Harbor Energy deepwater port would consist of a 60.5-acre manmade island to be located 11.7 nautical miles south of the City of Long Beach, New York, and 16.5 nautical miles east of Highlands, New Jersey. On June 29, 2010, Atlantic Sea Island Group LLC advised MARAD and the USCG of their intention to cancel work on the Safe Harbor Energy project for an indefinite period of time. By letter dated July 23, 2010, MARAD and the USCG acknowledged withdrawal of Atlantic Sea Island Group LLC's Safe Harbor Energy deepwater port license application, and thereafter terminated all federal processing activities.

Liberty Natural Gas, LLC (hereinafter referred to as Liberty or the Applicant) filed an application on September 28, 2010, to own, construct, and operate a liquefied natural gas deepwater port, located approximately 14 nautical miles off the coast of New Jersey near Asbury Park. However, the Governor of New Jersey issued a letter disapproving the Liberty application on February 8, 2011. Liberty submitted an amended, deepwater port application on November 29, 2011 and withdrew its application on March 30, 2012. Accordingly, in a letter dated April 25, 2012, MARAD accepted Liberty's withdrawal and terminated the application and all related processing activities. To date, the project remains closed with MARAD.

6.1.1.2 Onshore LNG Terminals

There are currently three existing onshore LNG terminals on the Atlantic Coast. Of these, two are currently proposed to add natural gas liquefaction capabilities to their facilities for exportation. In addition to the three existing facilities, a fourth onshore LNG terminal is proposed in Maine (Figure 6.1-2).

Everett is an existing LNG import terminal located in Everett, Massachusetts. The terminal received its first shipment of LNG in November 1971. The 35-acre site includes a marine terminal for cargo unloading, two double-walled aboveground LNG storage tanks, and associated equipment. On January 10, 2001, the Federal Energy Regulatory Commission (FERC) issued a certificate authorizing the construction of four new submerged vaporization units to increase the capacity of the vaporization equipment.

Cove Point is an existing LNG import terminal located in Calvert County, Maryland, which was constructed in the mid-1970s. Deliveries were suspended in 1980 due to the high price of LNG imports. Cove Point received its first commercial delivery in 23 years in August 2003. On April 29, 2005, the FERC issued a notice of application for authorization to expand the existing Cove Point LNG terminal by: (1) adding two new storage tanks to increase send-out capability and storage; and (2) constructing five new pipelines totaling about 161 miles in length, to be located in Calvert, Prince Georges, and Charles Counties, Maryland, and Juniata, Mifflin, Huntingdon, Centre, Clinton, Green and Potter Counties, Pennsylvania, to deliver additional capacity to pipeline connections in Virginia and Pennsylvania. On April 1, 2013, Dominion Cove Point LNG, LP filed an application with the FERC for its Cove Point Liquefaction Project. On September 29, 2014, Dominion received FERC authorization for their liquefaction facility and bi-directional pipeline.

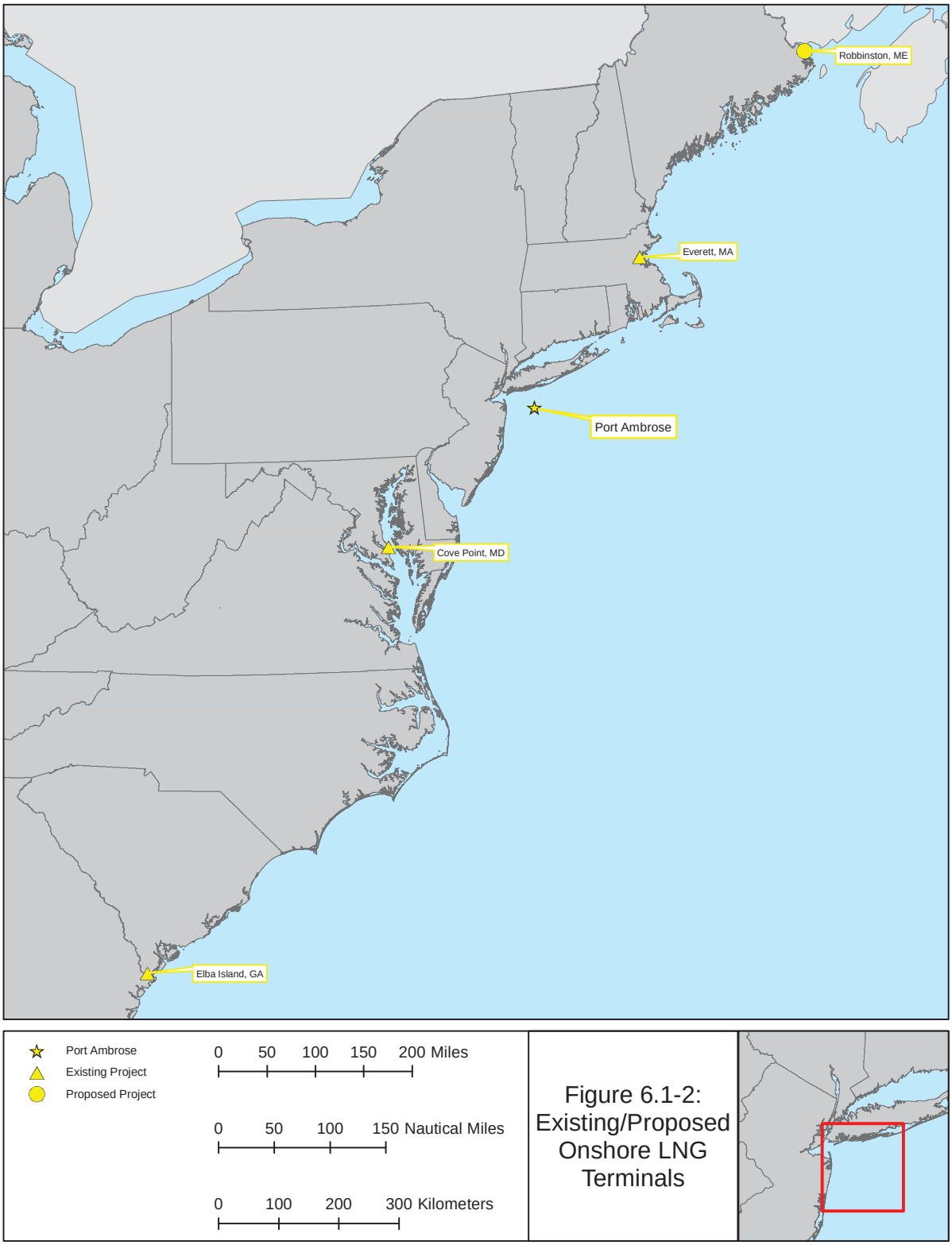

Figure 6.1-2. Existing/Proposed Onshore LNG Terminals

Elba Island is an existing LNG import terminal located on Elba Island, in Chatham County, Georgia, 5 miles downstream from Savannah, Georgia. The initial authorization for the Elba Island facility was issued in 1972. LNG shipments ceased during the first half of 1980 and received authorization to re-commission and renovate its facilities on March 16, 2000. On April 10, 2003, the FERC issued an order authorizing the expansion of the facility, which included adding a second and third docking berth, a fourth cryogenic storage tank, and associated facilities. On March 1, 2013, the FERC granted approval to initiate the pre-filing review of a proposed two-phased natural gas liquefaction and export project and a proposed two-phased project to add compression along the existing pipeline to provide natural gas to the terminal.

Downeast LNG, Inc.'s proposal includes the construction and operation of an LNG marine import terminal, including a pier with a single berth, two LNG storage tanks, LNG vaporization and processing equipment, and various ancillary facilities, in the Town of Robbinston, Washington County, Maine, and a 29.8-mile-long pipeline extending from the proposed terminal to an interconnect point with existing gas pipeline facilities of Maritimes and Northeast Pipeline, L.L.C. near Baileyville, Maine. A formal application was submitted by Downeast LNG, Inc. on December 22, 2006. The FERC issued a final EIS on May 15, 2014. On August 7, 2014, the FERC issued a Notice of Suspension of the Environmental Review Process in response to the July 22, 2014 filing in Docket No. PF14-19-000. Downeast Liquefaction, LLC, Downeast LNG, Inc., and Downeast Pipeline, LLC intend to amend the existing applications before the Commission by January 2015 to include export capabilities.

It is considered unlikely that construction impacts related to the proposed Project and the existing and proposed onshore LNG terminals would impact similar resources. In addition, given the large distance between the proposed Project and these terminals, it is considered unlikely that environmental impacts would overlap with the proposed Project.

6.1.1.3 Other Offshore Pipelines

Transco has proposed their Rockaway Delivery Point Project. The 26-inch-diameter pipeline and associated subsea manifold would deliver natural gas from an offshore interconnect with Transco's existing Lower New York Bay Lateral in the Atlantic Ocean to an onshore delivery point into the National Grid system on the Rockaway Peninsula in Queens County, New York. The pipeline facilities would include a dual subsea hot-tap assembly from the existing 26-inch diameter Lower New York Bay lateral pipeline and a subsea manifold and tie-in spool that includes a launcher for an inspection and cleaning pig. The pipeline consists of approximately 2.82 miles of offshore pipeline and 0.38 mile of onshore pipeline. The project would provide additional service to National Grid NY and KeySpan Gas East Corporation on the Rockaway Peninsula in Queens County, New York. Transco filed an application with the FERC on January 7, 2013. The FERC issued a Notice to Proceed with construction on June 6, 2014.

6.1.1.4 Transmission Line Projects

The Neptune Regional Transmission System is a 65-mile underwater and underground high voltage direct current (HVDC) transmission line that extends from a converter station in Sayreville, New Jersey to a converter station in North Hempstead, New York. The HVDC cable runs approximately 50 miles under the Raritan River in New Jersey and the Atlantic Ocean, and an additional 15 miles buried alongside the Wantagh Parkway. Underwater, the three cables were bundled and buried 4 to 6 feet under the river and seabed using a ship and equipment specially designed and outfitted for this purpose. On land, the cables were buried 3 to 4 feet below ground in separate conduits using conventional trenching and horizontal directional drilling methods. Neptune began construction in June 2005 and was completed in June 2007, on budget and ahead of schedule (Neptune Regional Transmission System 2013).

The Poseidon Project is a 500-megawatt submarine HVDC interconnection from Pennsylvania, New Jersey and Maryland's bulk power grid to Long Island's transmission and distribution network. The estimated length of the transmission facility is 76 miles with 43 miles underwater and 33 miles

underground. In New Jersey, the HVDC line would be located along existing rights-of-way to the bank of the Raritan River and then would be buried in the New York Bight and the Atlantic Ocean until it reaches central Long Island. The line would continue underneath Jones Beach and then follow a buried path along existing rights-of-way to a converter station to be built near the Ruland Road substation in Huntington, New York (Poseidon Transmission LLC 2012). Should the Poseidon Project move forward, the proposed Port Ambrose Project would be located in a similar area in the New York Bight. The proposed Mainline would be parallel to and/or would cross the underwater portion of the Poseidon Project's HVDC line.

6.1.1.5 Sand Borrow Areas

The Minerals Management Service (MMS) identified and evaluated five potential borrow areas in the New York Bight area for beach replenishment (MMS 2009). The U.S. Army Corps of Engineers (USACE) New York District has three leases for offshore sand borrow areas from the Bureau of Ocean Energy Management (BOEM). The proposed Mainline route from MP 16.5 to MP 19.3 is approximately 0.6 nautical mile southwest of the closest sand borrow area (Figure 3.7-1). The proposed Mainline would not cross any sand borrow areas.

6.1.1.6 Other Proposed Energy Projects

Wind Energy Projects

On September 8, 2011, the Long Island-New York City Wind Collaborative filed a lease application for a wind farm in the New York Bight. The Long Island-New York City Offshore Wind Project would be located within a 65,000-acre area approximately 14 nautical miles southeast of Rockaway Peninsula, Long Island in between the Hudson Canyon to Ambrose Shipping Lane and the Ambrose to Nantucket Shipping Lane. On, January 4, 2013, the BOEM issued a Request for Interest to assess whether other parties were interested in developing commercial wind facilities in the same area. Two companies, Fishermen's Energy, LLC and Energy Management, Inc., submitted nominations expressing interest in the area, thereby initiating the competitive leasing process pursuant to 30 CFR 585.210. As of the publication of this document, a decision has not been made on the lease blocks.

Should the Long Island-New York City Offshore Wind Project move forward, the proposed Port Ambrose Project would be located within some of the same lease blocks. In a letter dated July 19, 2013 from BOEM regarding the proposed Port Ambrose Project, BOEM expressed several concerns regarding the co-existence of the two projects. In addition to the environmental concerns that are addressed in Sections 3 and 4 of this document, BOEM expressed concerns over navigational safety and LNG regasification vessels (LNGRVs) operating in close proximity to offshore wind turbines.

Liberty filed comments in response to BOEM's Commercial Leasing for Wind Power on the Outer Continental Shelf (OCS) Offshore New York - Request for Interest and Call for Information and Nominations.

If both projects should move forward, the area occupied by the proposed Port itself, including the Safety Zone, NAAs and the ATBA, would eliminate approximately 1 percent of the lease area for turbine installation. In addition, sufficient safe setback or buffer distance between shipping routes and wind turbines would have to be established, which would also eliminate some of the available wind turbine area. Liberty's setback recommendation in their comments to BOEM noted above recommended setback for shipping routes to and from the proposed Port that would take approximately 4 percent of the available wind farm area. Currently, there are no regulations governing this and there are no actual proposed wind turbine locations to actually evaluate further. The USCG is currently working on guidance to address such safe setback distances.

Hydrokinetic Energy Projects

A pilot commercial license was issued by the FERC for the Verdant Power Roosevelt Island Tidal Energy Project in January 2012 (FERC Docket Number P-12611-005). Verdant Power plans to develop a one megawatt pilot project in the East Channel of the East River adjacent to New York City. The proposed project would consist of a field array of thirty 35-hilowatt, 5-meter-diameter axial flow Kinetic Hydropower System turbine-generator units mounted on 10 triframe mounts, with a total capacity of about one megawatt; underwater cables from each turbine to five shoreline switchgear vaults, that would interconnect to a control room and interconnection points; and appurtenant facilities for navigation safety and operation.

The New York Tidal Energy Company filed a draft license application for a pilot license in May 2010 (FERC Docket Number P-13730-000). The proposed Astoria Tidal Energy Pilot Project would be located in the East River at Hell Gate, in New York City, New York and would consist of a 2-meter-diameter 20-kW capacity hydrokinetic device during Phase 1, which would be replaced by a 6-meter-diameter 200-kW device in Phase 2; an underwater cable connecting the hydrokinetic device to shore at one of two proposed locations; and appurtenant facilities for operating and maintaining the project.

6.1.2 Activities Considered Cumulative with Onshore Project Impacts

Liberty has proposed multiple sites for potential use as pipe staging and concrete weight coating (CWC) facilities. Several sites in the New York City, Staten Island and Long Island areas are currently being evaluated by Liberty for their suitability. Two additional remote sites at Quonset Point, Rhode Island and Port of Coeymans, New York have been proposed by Liberty.

- Quonset Point, Rhode Island - A site located at Quonset Point in North Kingstown, Rhode Island, approximately 135 miles north of the Port of New York and New Jersey. The site is formed by three non-contiguous parcels, and at least one of these parcels would be needed for the proposed Project. These parcels are between the west side of Northrup Road, the north side of Foster Road, and east of Davisville Road (Site 1); north of the intersection of Ocean State Drive and Commerce Park Road, and east of Custom Designs, Inc. (Site 4); and the pier west of the intersection of Cooper Street and Keel Street (Pier 2). The Quonset Point location is part of an existing commercial/industrial complex with sufficient space and access to Narragansett Bay to accommodate the pipe staging and CWC facilities required to support construction of the proposed Project pipelines. Use of the property for this purpose is consistent with the land use and planning for the property and adjacent properties. In addition, there has been prior FERC approval for use of the site in other, similar construction projects. This site has been used for several CWC application operations.

- Port of Coeymans, New York - A site located in the town of Coeymans, New York on the west side of the Hudson River. The site is approximately 155 miles north of New York Harbor and consists of six possible storage locations. Five of the locations are between the river and Route 114, and one is on the east side of Route 114. All locations between the river and Route 114 have been heavily mined, filled, and graded in connection with the property's extensive industrial history. The location on the west side is a large, mostly level field. The Port of Coeymans is an existing industrial facility that has historically supported many of the same functions and use of the property for this purpose is consistent with the land use and planning for the property and adjacent properties.

Liberty is also evaluating several locations in the New York region for their construction base, which would include offices and a warehouse, as well as a leased boat slip for the support vessel staging area. No sites have been proposed or evaluated for Liberty's offices and warehouse for operation or the support vessel staging area.

6.2 Cumulative Impacts Analysis for the Proposed and Alternative Deepwater Port and Offshore Pipelines

This analysis evaluates the cumulative impacts related to past, present and reasonably foreseeable future projects within the vicinity of the proposed Project. The cumulative impacts are presented by resource and only those actions that result in similar marine impacts on the proposed Project are addressed in this analysis. None of the deepwater ports or onshore LNG terminals described above are located within the vicinity of the proposed Project and therefore are not included in the cumulative impacts analysis in this section.

6.2.1 Water Resources

Construction, operation, and decommissioning of the proposed Project would result in minor, short-term to long-term, adverse impacts on water resources. During construction, impacts on water resources would primarily be related to water quality associated with routine discharges, seafloor disturbance, hydrostatic test/pigging discharges, and inadvertent spills. These adverse impacts would generally be minor and short-term. Impacts during operation would primarily be associated with seafloor disturbance from anchor chain sweep, seawater intake and inadvertent spills. Operational impacts would be minor, long-term and adverse. Decommissioning impacts would be similar to those for construction.

Inadvertent spills could occur during construction, operation, or decommissioning of the proposed Project. These spills could be associated with petroleum or hazardous materials stored on the proposed Project vessels. All vessels would implement protective measures, have a spill response plan as required by the USCG, and would comply with all applicable regulations intended to minimize the risk of an inadvertent spill and minimize the impacts of a release if one were to occur. An inadvertent release of LNG could also be associated with the proposed Port. However, the likelihood of a release would be low based on the mitigation measures and the physical properties of LNG, which would result in minimal impact to water resources.

In addition to the vessel traffic already traversing the New York Bight, several other projects could impact water quality in the vicinity of the proposed Project. These include Transco's Rockaway Delivery Point Project, the Long Island-New York City Offshore Wind Project, National Pollutant Discharge Elimination System (NPDES) outfalls that discharge into the New York Bight, navigational dredging and port expansion projects, and USACE projects relating to navigation and coastal storm damage reduction.

6.2.2 Biological Resources

Construction, operation, and decommissioning of the proposed Project would result in minor, short-term to long-term, adverse impacts on biological resources. During construction, impacts on biological resources would primarily be related to seafloor disturbance, turbidity, intake and discharge, inadvertent spills, noise, vessel traffic, marine debris, entanglement, and lighting. These adverse impacts would generally be minor and short-term. Impacts during operation and decommissioning would be similar to those for construction; however, operational impacts would be more long-term.

Seafloor disturbance, turbidity, and intake and discharge impacts on biological resources would be greatest during construction activities but would be limited to the immediate vicinity of construction activities. If an animal approaches the proposed Project area during construction, it would likely move away from the activity. Given the dynamic nature of sediment processes in the proposed Project area, alterations to seafloor habitat would be temporary and localized, and the benthic community would be expected to rapidly recover following construction.

Routine vessel discharges during construction would not result in adverse impacts on biological resources. Accidental releases of fuel, oil, and other chemicals stored and/or in use in support of

construction are highly unlikely, but could degrade water quality with potential adverse short-term impacts.

Sources of underwater construction noise associated with the proposed Project include impact pile driving (from anchor pile installation), proposed Mainline and pipeline lateral installation, and construction vessel transit. It is likely that most animals would leave the construction area temporarily because of in-water disturbances, thereby minimizing the impact of noise. Continuous noise created by construction vessels could create masking effects among marine mammals; however, ambient noise levels in the proposed Project area and surrounding waters are elevated and variable due to existing levels of shipping, fishing, and recreational vessel traffic. Temporary increases due to construction vessel traffic would minimally contribute to that ambient noise.

While it is known that an increase in vessel traffic increases the risk of collision, the proportional probability of that risk associated with construction vessels cannot be quantified, particularly when vessel traffic is already high. Large vessels are only likely to mobilize/demobilize to the construction site once, whereas smaller vessels may transit the proposed Project area multiple times. Therefore, large vessels used for construction would only be a concern for a short duration. Additionally, a Marine Mammal and Sea Turtle Vessel Strike Avoidance Plan has been prepared (Appendix K) and followed by vessel crew to decrease risk of collisions.

Ingestion of marine debris and entanglement in anchor lines, tethers, or other materials could result in adverse impacts on biological resources. The combination of Project policy and existing regulations would ensure that any marine debris accidentally expended within the proposed Project area would be minor, and that the potential for marine mammal entanglement and impacts would be short-term and minor.

Certain types of lighting are known to attract some marine organisms, including marine mammals and sea turtles, birds, and fish. The Applicant has committed to minimize the amount of lighting needed directly on the water surface, while still providing a safe work area.

Construction, operation, and decommissioning of the proposed Project in conjunction with construction of the Long Island-New York City Offshore Wind Project and Rockaway Delivery Point Project could result in additional cumulative impacts on biological resources if activities occurred concurrently, which is unlikely. Cumulative increases in operational vessel traffic would be moderate compared to ambient conditions in the proposed Project area. Since any construction-related impacts would be temporary in duration and localized in scope, the long-term, cumulative effect would be expected to be minor.

6.2.3 Threatened and Endangered Species

Construction, operation, and decommissioning of the proposed Project would result in minor, short-term to long-term, adverse impacts on threatened and endangered species, similar to impacts on biological resources, as described in Section 6.2.2.

Vessel ship strikes are the most substantial threat to Endangered Species Act (ESA)-listed species, especially the North Atlantic right whale. While an increase in vessel traffic increases the risk of collision, the proportional probability of that risk associated with construction vessels cannot be quantified, particularly when vessel traffic is already high. Large vessels are only likely to mobilize/demobilize to the construction site once, whereas smaller vessels may transit the proposed Project area multiple times. Therefore, the risk of strike from a large vessel has a smaller likelihood.

Although construction of the proposed Project would result in seafloor disturbance and an increase in turbidity, it is unlikely that an ESA-listed species would be present in this area. If a listed animal approaches the impact area during construction, the animal would likely move away from the activity and return shortly after the conclusion of construction.

Sources of underwater construction noise associated with the proposed Project include impact pile driving, proposed Mainline and pipeline lateral installation, and support vessels. Under the Marine Mammal Protection Act (MMPA), the potential acoustic exposures from the proposed Port operations activities are expected to be within the non-injurious behavioral effects zone (Level B harassment) for marine mammals.

The potential accumulation of debris in the proposed Project area could increase the potential of harm to threatened and endangered species, especially listed sea turtles, via ingestion or physical entanglement. All vessels and activities associated with the proposed Project would adhere to USCG guidelines regarding the deposition of inorganic materials overboard.

Construction, operation, and decommissioning of the proposed Project in conjunction with other past, present, and reasonably foreseeable future actions could result in additional cumulative impacts on threatened and endangered species if activities occurred concurrently, which is unlikely. Cumulative increases in operational vessel traffic would be moderate compared to ambient conditions in the proposed Project area. Since any construction-related impacts would be temporary in duration and localized in scope, the long-term, cumulative effect would be expected to be minor.

6.2.4 Cultural Resources

Seafloor disturbance during construction, operation, and decommissioning could impact cultural resources. The proposed Project vicinity was once exposed land surface and therefore could have been travelled by Native Americans and Euroamericans. However, a long history of marine development may have diminished the potential for cultural artifacts in the vicinity of the proposed Project. Remnants of various types of vessels, vessel fragments, and possibly other associated cultural items could be contained within the vicinity of the proposed Project and any impact on cultural resources could be considered significant.

A remote sensing survey identified areas within the proposed Project vicinity that have the potential to contain cultural resources. A formal evaluation of these targets was recommended. Liberty has developed an Unanticipated Discoveries Plan (Appendix L) that outlines procedures to be taken if cultural resources are discovered during construction, operation or decommissioning of the proposed Project.

The avoidance of surveyed cultural sites, in conjunction with implementation of the Unanticipated Discoveries Plan, would make it unlikely that the proposed Project would adversely affect cultural resources. Other projects requiring federal or state permits would also be required to avoid potential impacts on cultural resources. Thus, construction, operation, and decommissioning of the proposed Project would not be expected to result in any cumulative impacts on cultural resources.

6.2.5 Ocean Uses, Land Uses, Recreation, and Visual Resources

Commercial and recreational vessel traffic in the New York Bight consists of cargo ships, cruise ships, fishing vessels, wildlife tours, and personal and recreational pleasure crafts. The proposed Project and associated Safety Zone would not be expected to cause any major impacts on ocean uses in this area. Fishing vessels would experience the largest impact if historic fishing grounds were located within the proposed Project area or the Safety Zone. All commercial and recreational vessels would be allowed to operate normally outside the Safety Zone, No Anchoring Areas (NAAs), and the Area to be Avoided (ATBA).

Port Ambrose would also be located in one of the USCG weapons training areas and in proximity to a U.S. Navy Operating Area (OPAREA). Operations could continue as normal with appropriate communication and coordination of activities.

At this time, Liberty has not identified specific locations for onshore facilities. Liberty has indicated that the selected locations would be capable of supporting the construction and operation activities with the

appropriate size, location, accessibility, infrastructure, and availability. Existing third-party contractors selected by Liberty would manufacture the facility components; therefore, construction, operation, and decommissioning of the proposed Project would not be expected to result in any cumulative impacts on land use.

Construction of the Long Island-New York City Offshore Wind Project, Rockaway Delivery Point Project, Poseidon Project, Verdant Power Roosevelt Island Tidal Energy Project, and Astoria Tidal Energy Pilot Project could result in additional cumulative recreational impacts based on the extent of any restricted areas during construction and/or operation and due to loss of seafloor habitat for certain fish species. Transiting vessels may be required to avoid direct routes to continue with their voyage, possibly resulting in short delays in order to maintain a safe distance from the construction area.

Due to the distance for the proposed Project facilities from shore, visibility of proposed Project facilities would be limited to immediate shore points and offshore viewer groups and an existing visual landscape of open ocean with vessels ranging from small non-motorized recreational vessels to large oceangoing vessels. Cumulative visual impacts during construction, operation, and decommissioning of the proposed Project would be avoided due to the existing visual character of the proposed Project area.

6.2.6 Socioeconomics

The overall offshore installation/construction would be completed during an approximate nine-month period over a single calendar year (2016). Liberty does not anticipate being in any one area for more than 60 days as construction progresses along the proposed Mainline route; however, commercial vessels, including those involved with commercial and recreational fishing and other marine-based tourism, would be temporarily excluded from the vicinity of construction, operation, and decommissioning activities. Short-term, moderate and beneficial impacts on onshore economic conditions also would result from the proposed Project.

Construction, operation, and decommissioning of the proposed Project in conjunction with other past, present and reasonably foreseeable future actions could result in additional cumulative impacts on socioeconomic resources if activities occurred concurrently, which is unlikely. Cumulative increases in operational vessel traffic would be moderate compared to ambient conditions in the proposed Project area. Since any construction-related impacts would be temporary in duration and localized in scope, the long-term, cumulative effect would be expected to be minor.

6.2.7 Transportation

The proposed Project is located in the vicinity of one of the busiest ports in the United States. In addition, recreational and commercial fishing vessels utilize the area. Construction vessel traffic would consist of three to five vessels/barges daily for nine months. Currently, the Port of New York and New Jersey experiences approximately 110 arrivals and 109 departures per day. During operations, the proposed Project is expected to receive approximately 45 LNGRVs per year. This would present a 1.7 percent annual increase in total Category A vessel traffic for the Port of New York and New Jersey, between a 2.5 and 12.3 percent annual increase in the Ambrose to Nantucket outbound traffic lane, and between a 12.3 and 24.6 percent annual increase in the Hudson Canyon to Ambrose inbound traffic lane. In addition, the support vessel is expected to make approximately 75 roundtrips per year, a roundtrip for each time an LNGRV calls on the proposed Project and routine trips for maintenance activities. This would result in a negligible increase of vessel traffic in the New York Bight.

If constructed concurrently, construction vessel traffic from other past, present and reasonably foreseeable future actions could increase the number of construction vessels in the vicinity of the proposed Project. However, vessel information has not been provided by these actions. Operation vessel traffic for the Long Island-New York City Offshore Wind Project would likely result in a negligible increase in vessel traffic.

6.2.8 Air Quality

Impacts on local and regional air quality could result from construction and operation of the proposed Project. Construction of the proposed Project would produce air emissions from diesel engines used for vessel propulsion and electric generation. Air quality modeling results indicated that Project emissions would meet all New York and federal ambient air quality standards.

6.2.9 Greenhouse Gases and Climate Change

There are no thresholds established to evaluate whether project-specific increases in greenhouse gas (GHG) emissions, as presented in Section 4.10.7, would have a measureable cumulative impact on global climate. When aggregated with all worldwide new sources of GHGs, each individual project contributes a very small fraction to the increase in worldwide GHG emissions and an even smaller fraction to the total worldwide GHG emissions. It is not currently possible to measure or partition the portion of global climate change that can be attributed to an individual project's contribution to the cumulative GHG emission increase. However, availability of additional natural gas due to LNG importation may displace the use of other higher carbon emitting (per unit energy produced) fuels such as coal or oil.

An EIS prepared by MMS identified that global warming conditions in the Atlantic Region would result in increased erosion of shorelines and beaches, increased salinity of estuaries and freshwater aquifers, altered tidal ranges in rivers and bays, changes in sediment and nutrient transport, and increased coastal flooding during storms. The warmer temperatures also may affect stratification and rates of phytoplankton production and nutrient regeneration, as well as shifts in distribution of marine populations. Species temperature preferences and overall habitat requirements would determine the extent of potential distribution shifts. For some species, the habitat requirements related to spawning and nursery areas may limit adaptation, which could result in population loss. Temperature changes may also impact food web dynamics of the ecosystem and the distribution of fish, marine mammals, and sea birds (MMS 2007).

6.2.10 Noise

Noise-generating activities would be expected during construction, operation, and decommissioning of the proposed Project. Noise generated during construction and operation would be outside the range of perceptibility at any nearshore or onshore areas. The exception would be periodic construction and support vessels originating and returning to the onshore staging area that may be perceptible at certain nearshore and onshore locations.

Assembly and placement of Project components in conjunction with construction vessel operation would result in noise that may exceed ambient conditions within the vicinity of the proposed Project's staging area. Noise from offshore construction activity would attenuate over the large separation distances to onshore areas. Establishment of a temporary Safety Zone around offshore construction work areas would also serve to mitigate impacts by reducing the range of potential audibility. For commercial or recreational vessels operating nearby, the proposed Project noise would be largely masked by vessel engine noise. Recreational water craft without operating motors (e.g., sailing, drifting) present in the vicinity of the proposed Project but outside the safety zone would be the only individuals that would potentially notice proposed Project noise, and any impact would be considered minor.

Airborne noise produced by operation of the proposed Project, combined with noise associated with existing vessel traffic and noise associated with other past, present and reasonably foreseeable future actions could result in an adverse cumulative impact on human and biological resources. In addition to existing vessel traffic, construction of the proposed Project and the Long Island-New York City Offshore Wind Project would result in minor, short-term adverse cumulative impacts to airborne noise if activities occurred concurrently, which is unlikely. The proposed Project's distance from shore, typical ambient offshore noise levels, and the buffer provided by the Safety Zone would result in only a localized, long-term, minor adverse cumulative impact associated with in-air noise levels.

Reasonably foreseeable future actions are defined as other proposed energy related infrastructure that are similar in nature to the proposed Project that are planned to occur in the immediate action area and have either received permits necessary for construction or have an active application under review with permits pending. The proposed Project is located within an area which is designated as a suitable site within for offshore renewable energy development. When considered together with the Long Island-New York City Offshore Wind Project, underwater noise generated by the turbines during operation can vibrate down the towers into the submerged foundations and into the surrounding water and seabed. In turn, this noise may be perceived by fish, sea turtles, and marine mammals within and outside of the proposed wind project area. Consequently, some species may avoid the project area while others may experience no impact. The hearing abilities of each species likely determine the behavior of wildlife near turbines and their typical avoidance behavior and distances (NYSERDA 2010). However, as operational noise from offshore wind turbines are generally low level, no cumulative impacts are expected if both projects are constructed given the separation distances between the two facilities. There are currently no other renewable energy projects or other offshore development projects existing or proposed. Therefore, no operational cumulative impacts are anticipated.

Construction will generate short-term temporary underwater noise levels that will not be continuous, but will vary as equipment usage changes throughout the construction period. Although construction will generate high intermittent noise, it will cease upon completion of construction. The proposed Project will avoid impacts on marine mammals and sea turtles pursuant to the MMPA through the implementation of mitigation procedures as determined with NOAA Fisheries. Construction of the proposed Project and the Long Island-New York City Offshore Wind Project would result in minor, short-term adverse cumulative impacts to underwater noise if activities occurred concurrently, which is unlikely. Construction of the proposed Project is expected to occur prior to the Long Island-New York City Offshore Wind Project, and as a result, impacts from concurrent construction activities are not anticipated. Notably, no permits have been issued for the Long Island-New York City Offshore Wind Project, nor are any permit applications pending.

6.2.11 Safety

The DWPA requires the establishment of a zone of appropriate size around and including any deepwater port for the purpose of navigational safety. In such zone, no installations, structures, or uses are permitted that would be incompatible with the operation of a deepwater port. The navigational safety measures within the Safety Zone, NAAs, and the ATBA discussed in Section 5.5.2 would be incorporated into Port operations with final dimensions and mandatory or recommendatory restrictions yet to be assessed for safety and security. It is likely, however, that the proposed dimensions would be a starting point for this assessment.

The USCG has promulgated regulations that provide requirements for the establishment of, restrictions, and location of safety zones, NAAs, and ATBAs around deepwater ports (33 CFR 150, Subpart J. As set forth in the application, the proposed Safety Zone would have a radius of 1,640 feet from the center of each submerged turret loading buoy (STL Buoy) encompassing a combined area of approximately 388 acres or 0.6 square mile. All unauthorized vessels would be prohibited from anchoring or transiting the proposed Safety Zone at any time.

In addition to the Safety Zone, NAAs and an ATBA would be established.[11] As set forth in the application, the proposed NAAs and the ATBA would be the same size with a radius of 3,281 feet from the center of each STL Buoy. This would total approximately 1,552 acres or 2.4 square miles around each

[11] NAAs and ATBAs are established by the IMO pursuant to a request from the U.S. Government. If approved, each zones' specific boundary would be set forth via regulation.

STL Buoy (Figure 2.1-12).[12] The NAAs and the ATBA are designed to ensure that other vessels do not interfere with the deepwater port operations, including maneuvering of the LNGRV and support vessel.

Past practice has been that ATBAs have a radius of at least 820 feet longer than that of the NAAs for appropriate stand-off, which would occupy an area of 1,213 acres around each buoy. The actual size of the ATBA that would be requested of the International Maritime Organization (IMO) would be determined through the advice and consent of the USCG.

Both the NAAs and the ATBA would appear on subsequent editions of local and regional nautical charts. No vessels would be allowed to anchor in the NAAs to prevent damage to the STL Buoy and mooring system or damage to the proposed Port's equipment from entanglement. The restriction would likely also apply to bottom trawling. The ATBA is meant to discourage vessel traffic. It would help ensure that other vessels do not interfere with the deepwater port's operations, including the maneuvering of the LNG carrier and its support vessel. Both the NAAs and the ATBA are normally recommendatory.

LNG vessel traffic would be coordinated by Liberty personnel (Figure 2.1-13).

There are currently no deepwater ports or other fixed offshore structures in the New York Bight. However, there is currently a lease application for the Long Island-New York City Offshore Wind Project located within several of the same lease blocks as the proposed Project.

The same regulations and safety precautions can be applied to terrorist attacks. Unfortunately, intentional acts of terrorism cannot clearly be predicted or prevented. Following September 11, 2001, several studies assessed the public and environmental consequences of spills resulting from attacks on LNGRVs. The results concluded that outcomes and possible safety hazards resulting from an attack on an LNGRV are manageable by implementing the current daily safety standards for unintentional spills.

The addition of the proposed Project would minimally increase the safety and hazardous risk in the region. Any incident occurring at the proposed Project would rely on emergency procedures outlined in the Deepwater Port Operations Manual. Despite heightened concerns, there are no anticipated cumulative impacts on safety and hazardous risk as a result of the proposed Project. Safety factors associated with the proposed Project location, installation, and operations are presented in Section 5.0. Adherence of other vessels to the established Safety Zone, NAAs, and the ATBA around the proposed Project would minimize the potential for safety hazards, and these safety zones would be strictly enforced by the USCG.

Coordination of Project activities during construction, operation, and decommissioning would include appropriate Local Notice to Mariners (LNMs). Additionally, Marine Safety Information Broadcasts (MSIBs) would be issued whenever Port-related activities (e.g., construction, marine mammal monitoring or general Port operations) are occurring. Vessel traffic associated with other projects typically would not be in the general vicinity of the proposed Project. The exception to this would be the Long Island-New York City Offshore Wind Project. However, it is unlikely that these two projects would be constructed concurrently, thereby reducing potential impacts during construction.

[12] As a matter of practice, if an LNG carrier is present and on the STL Buoy, the USCG would extend the Safety Zone by a distance equivalent to the length of the LNG carrier (approximately 984 feet in length) to account for weathervaning (rotation) of the vessel around the STL Buoy, a distance of approximately 2,624 feet.